

ABSTRACT

A stationary power plant intended for use in houses and industrial or commercial buildings includes a high temperature fuel cell, a reformer for converting hydrocarbon fuel into a fuel mixture of hydrogen and carbon monoxide, a combustion chamber, and a volume expansion engine. The fuel mixture from the reformer enters the fuel cell, where it is processed along with oxygen from the air to produce electricity. The hot gases exiting the fuel cell, including unprocessed fuel, are passed to the combustion chamber where the fuel remnants are burned resulting in better fuel efficiency. The exhaust from the combustion chamber drives the volume expansion engine. The fuel cell, combustion chamber and volume expansion engine combination provides better dynamic load response than other fuel-cell-based power plants. One example of an entire building fuel cell power plant is disclosed which can operate in various modes to drive or thermally modify building water, air, sewage, and/or electricity.